REMARKS

Reconsideration and allowance of the subject application are respectfully requested. Claims 1-9 and 18-24 remain pending in the instant application. Claims 1, 18, 21 and 24 are independent.

Applicants wish to thank the Examiner for the time granted to discuss the merits of the present application on December 29, 2005. During the course of this telephone discussion, Applicants' representative presented patentability arguments regarding the presently-pending claims. Applicants' representative further expressed the position that the present Office Action fails to give full faith and credit to the previous Examiner's indication of patentable subject matter set forth on page 6 of the Office Action dated January 19, 2005. Although not expressing agreement with Applicants' arguments, the Examiner indicated that such arguments would be reconsidered upon presentation of a formal reply. The substance of Applicants' arguments are presented below for the Examiner's reconsideration.

Full Faith and Credit to Actions of Previous Examiner

In the Office Action dated January 19, 2005, page 6, Examiner Butler indicated that:

> [C]laims specific to the combination of elements and environment of Fig. 1 would receive favorable consideration provided that the independent claim corresponds to claim 18 and claim 19 (the carbon-carbon composite) and that the brake is positively claimed in the body of the claim.

In a reply dated April 19, 2005, Applicants presented new claims, including independent claim 22, directed to a brake assembly and independent claim 24, directed to a disk stack for a brake assembly. Although newly-presented claims contained subject matter consistent with Examiner Butler's indication of patentable subject matter, the new Office Action rejects all claims in a manner that is believed to be inconsistent with Examiner's Butler's previous indication of patentable subject matter. MPEP § 706.04 states that:

> Full faith and credit should be given to the search and action of a previous Examiner unless there is a clear error in the previous action or knowledge of other prior art. In general, an Examiner should not take an entirely new approach or attempt to reorient the point of view of a previous Examiner or make any search in the mere hope of finding something.

At least for this reason, Applicants respectfully request that the Examiner reconsider the rejection of the new-presented claim 21-24. Furthermore, for at least reasons set forth below, Applicants respectfully submit that all pending claims should be indicated as allowable.

Objection to the Drawings

As set forth on page 2 of the Office Action, the Examiner objects to the drawings based on the reference number "46" in Fig. 1. In this reply, Applicants provide a replacement drawing sheet, which changes reference numeral "46" to reference numeral --44--, thereby correcting a typographical error. In view of this corrected drawing sheet, Applicants respectfully request that the drawing object be withdrawn.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 3, 4, 6, 18, 20, 21, 23, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hyde et al. (U.S. Patent No. 5,779,006, "Hyde '006") or Riebe (U.S. Patent No. 5,709,288) or Hyde et al. (U.S. Patent No. 5,558,186, "Hyde '186") or Cook (U.S. Patent No. 3,712,427) in view of Carew (U.S. Patent No. 2,013,948). Claims 2, 5, 7-8 and 19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over each of the combinations of Hyde '006 in view of Carew; Riebe in view of Carew; Hyde '186 in view of Carew; and Cook in view of Carew; and further in view of Pigford (U.S. Patent No. 4,982,818). Claim 9 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over each of the combinations of Hyde '006 in view of Carew; Riebe in view of Carew; Hyde '186 in view of Carew; and Cook in view of Carew; and further in view of Pigford and Hill et al. (U.S. Patent No. 4,011,055). These rejections are respectfully traversed.

By way of review, independent claim 1 is directed to a friction disk for a brake assembly comprising: an annular structural core; and at least one frictional lining disk. Claim 1 specifies that the annular structural core has at least one sinusoidally-shaped mounting surface and that the at least one frictional lining disk has "*an annular and sinusoidally-shaped mounting surface* and a relatively, flat wear surface *on an opposite side of said at least one frictional lining disk from said sinusoidally-shaped mounting surface of said at least one frictional lining disk, said*

mounting surface of each frictional lining disk matingly engaging said mounting surface of said structural core." (emphasis added)

Independent claim 18 is directed to a friction disk for a brake assembly comprising: an annular structure core; a first frictional lining disk; and a second frictional lining disk. Claim 18 specifies that the annular structural core has a first sinusoidally-shaped mounting surface and a second sinusoidally-shaped mounting surface, that the first frictional lining disk has "*an annular and sinusoidally-shaped mounting surface* and a relatively, flat wear surface *on an opposite side of said first frictional lining disk from said sinusoidally-shaped mounting surface of said first frictional lining disk, said mounting surface of said first frictional lining disk matingly and directly engaging said first mounting surface of said structural core*; and that the second frictional lining disk has *"an annular and sinusoidally-shaped mounting surface and* a relatively, flat wear surface *on an opposite side of said second frictional lining disk from said sinusoidally-shaped mounting surface of said second frictional lining disk, said mounting surface of said second frictional lining disk matingly and directly engaging said second mounting surface of said structural core.*" (emphasis added)

Independent claim 21 is directed to a brake assembly, which comprises: a torque tube for attaching to an axle of a wheel; a disk stack formed by an alternatively arranged plurality of stator and rotor disks; and a housing containing pressure piston devices for compressing the disk stack of stator and rotor disks, wherein at least one disk within said disk stack includes a friction disk. The friction disk specified in claim 21 includes, *inter alia*, an annular structural core having a first sinusoidally-shaped mounting surface and a second sinusoidally-shaped mounting surface; and a first frictional lining disk having an "annular and sinusoidally-shaped mounting surface and a relatively, flat wear surface on an opposite side of said first frictional lining disk from said sinusoidally-shaped mounting surface of said first frictional lining disk, said mounting surface of said first frictional lining disk matingly and directly engaging said first mounting surface of said structural core."

Independent claim 24 is directed to a disk stack for a brake assembly, wherein the disk stack is formed by an alternatively arranged plurality of stator and rotor disks. The disk stack of claim 24 comprises at least one friction disk within the disk stack, the friction disk having: an

annular structural core having a first sinusoidally-shaped mounting surface and a second sinusoidally-shaped mounting surface; a first frictional lining disk having "an annular and sinusoidally-shaped mounting surface and a relatively, flat wear surface on an opposite side of said first frictional lining disk from said sinusoidally-shaped mounting surface of said first frictional lining disk, said mounting surface of said first frictional lining disk matingly and directly engaging said first mounting surface of said structural core;" and a second frictional lining disk having "an annular and sinusoidally-shaped mounting surface and a relatively, flat wear surface on an opposite side of said second frictional lining disk from said sinusoidally-shaped mounting surface of said second frictional lining disk, said mounting surface of said second frictional lining disk matingly and directly engaging said second mounting surface of said structural core."

Hyde '006, Riebe and Hyde '186 all describe clamshell type structures with peripheral engagement of the frictional lining material. Specifically, recesses or windows of the carrier engage the frictional lining material along the outer edges of the frictional lining, not along the surface opposite to the wear surface. Relative movement between the carrier and the frictional lining elements of these references is prevented by the structure formed or engaging the frictional lining elements along their periphery, i.e., the edges of the windows contain the frictional lining element and further absorb or transmit forces from the wear surfaces to the relatively stronger structural core of Hyde '006, Riebe and Hyde '186. Accordingly, the alleged mounting surfaces of these primary references cannot reasonably be construed to include an annular and sinusoidally-shaped mounting surface. Further, one of ordinary skill in the art would not modify the alleged flat mounting surface, e.g., the flat portion lying within the window regions of the carrier to include the sinusoidally-shaped mounting surface(s) of the claimed invention as the edges of the windows are already designed to engage the frictional elements.

In the clamshell type of construction, the friction material is retained within recesses (see FIG. 2 of Riebe, FIG. 15 of Hyde '186, and FIGs. 15 and 16 of Hyde '006) and is secured to the carrier in a segmented, i.e., not annular, manner. Accordingly, this type of construction does not permit the modification suggested by the Examiner and allegedly taught by Carew. Specifically, the friction lining elements (for instance, element 42 in the Hyde patents) are retained along their

peripheries, e.g., not along a mounting surface opposed to the relatively flat wear surfaces (see col. 6, lines 22-48 of Hyde '006 and col. 5, lines 10-29). Accordingly, the retaining clips and recesses of the annular carriers of the clamshell type brakes prevent the friction lining elements from moving relative to the annular core. In contrast, the mounting surfaces between the annular core and the frictional lining elements of the claimed invention provide direct load transfer and simultaneously prevent movement of the friction lining elements relative to the annular core.

Since the frictional elements are secured within these windows along their periphery, the alleged modification of the clamshell type carriers/cores of Hyde '006, Riebe and Hyde '186 to include an annular sinusoidal mounting surface opposite to the wear surface would not have been obvious as the frictional elements are already secured at expressly different locations along their periphery. Accordingly, Carew does not teach or suggest any motivation to alter this type of clamshell type brake assembly to include sinusoidally shaped friction elements.

With respect to Carew, the Examiner has indicated that the drum brakes of Carew teach or suggest applying similar frictional lining elements to each of the primary references, e.g., disk brakes, relied upon by the Examiner. This interpretation is respectfully traversed. The Examiner has relied upon the embodiment of FIG. 3 of Carew to show that a subsidiary brake element of friction material for a drum brake includes transverse corrugations (element 16 and 18). The Examiner's position is that Carew's drum brake with transverse corrugations stands for the broader teaching that this type of physical structure, a reusable annular core having transverse corrugations matingly engaging with friction elements (element 17) can also be applied to disk brake assemblies. This position is respectfully traversed as being based solely on an improper hindsight, reconstruction of the prior art of record that is based on the teachings of Applicants' own invention.

Even if Carew were analogous to the disk brake art as suggested by the Examiner, Carew is clearly not analogous to the clamshell type friction segments described by the primary references. Applicants submit that the Examiner is ignoring the details of the "disk" brakes of the primary references when attempting to alter these same references to include features of the drum brake of Carew. Applicants submit that these rejections are improper as the Examiner has

overlooked the structure of the primary references that inherently teach against the alleged modifications advanced by the Examiner.

For example, Carew is clearly directed at drum brakes for automobiles, e.g., although Carew suggests that the drum brakes of Carew's invention are applicable to other vehicles that may employ drum brakes (see col. 4, lines 3-12). However, Carew does not teach or suggest the application of the curved metal core and the curved friction lining elements of Carew to disk brakes. This application of Carew's frictional lining elements (element 17) to a disk brake is merely the opinion of the Examiner as this suggestion does not come from the references themselves. Even if it were the Examiner's position that this motivation would have been implicitly suggested to one of ordinary skill in the art, this position is respectfully traversed as being unsupported by any of the references of the prior art of record.

None of the references teach or suggest annular and sinusoidally shaped mounting surfaces engaging an annular structural core. Accordingly, this rejection should be withdrawn. As previously stated, the transverse corrugations of Carew are relied upon by the Examiner as being the equivalent to the sinusoidally shaped mounting surfaces of the claimed invention. However, this position is respectfully traversed. None of the references of the prior art of record teach or suggest modifying the mounting surface opposite to a wear surface in a disk brake assembly to include annular and sinusoidally shaped mounting surfaces. As described by Carew at col. 2, lines 1-17:

> "The main brake element part and that side of the subsidiary brake element part which engages therewith will be formed with complementary irregularities so that when the latter is in position upon the former, *the circumferential displacement of the one with regard to the other will be rendered impossible*; the pressure exerted by the brake element as a whole through the medium of the subsidiary brake element part upon the brake drum merely causing said subsidiary and main parts to engage more effectively one with the other."

As described by Carew, the irregularities (transverse corrugations 16, 18) are provided to offset circumferential movement of the friction lining element (element 17 in FIG. 3) that is curved along the surface that forms the wear plane, i.e., a problem unique to drum brakes. Since Carew does not teach or suggest any application to disk brakes, the Examiner's contention that the mounting surfaces of Carew would have been applied to the primary references is improper.

The individual corrugations of Carew are provided to prevent the curved friction lining element from rotating within the drum or with respect to the curved, metal (thin slipper). When force is applied to one section of the friction lining element, the individual corrugations are provided to prevent the curved friction element from rotating, e.g., shifting circumferentially. The annular structural core and disks of the claimed invention (and the disk brakes of the prior art of record relied upon by the Examiner) are not susceptible to the circumferential movement described by Carew. Therefore, Applicants submit that Examiner's modification of the prior art of record is improper.

With respect to Cook, the prior art of record does not teach or suggest any known problems with the disk brake assembly shown by Cook. Carew does not teach or suggest the application of sinusoidally shaped mounting surfaces to disk brakes. Therefore, this combination would not have been obvious. Applicants submit that the Examiner's opinion that it would have been obvious to modify the primary references, e.g., such as Cook et al., to include the sinusoidally shaped mounting surfaces is somehow implicitly suggested in the references themselves is improper.

The Examiner will note that Cook et al. is directed at mechanical fasteners to secure core plate(s) 20 to frictional wear plates 22. Further, col. 2, lines 58-68 through col. 3, lines 1-12 further describe the expressed purpose of the brake disk assembly of Cook et al.:

> *FIGS. 4A, B, C, 5A, B, C and 6A, B, C represent the refurbishment cycle which is believed to represent the optimum procedure.* The first refurbishment is illustrated which shows in view 4A a brake disk indicated by numeral 50 which has been worn about 0.060 so that for a rotating disk it would have a thickness of about 0.480 inches and for a stationary disk about 0.520 inches. *The refurbishment technique in its first step will constitute grinding both faces of the disk 50 faces, or about 0.030 so that for a rotating disk the thickness would be approximately 0.450 inches and for a stationary disk the thickness would be about 0.490 inches.* The initial thickness is then achieved by refurbishing with a carbon plate or disk 52 as indicated in view 4C that is approximately 0.150 inches in thickness to thereby increase the overall disk thickness by that amount, hence bringing the total disk thickness up to the desired pre-worn condition. The plate 52 is attached in a manner as illustrated in FIGS. 1 through 3, but is attached only on one side as indicated in view 4C.

Cook et al. is clearly directed at a disk brake assembly that is specifically directed at refurbishment that involves grinding wear faces and replacing worn elements to return the disk brake assembly to a working thickness. Further, the mechanical fasteners for securing the thin plate to the core are designed for a system in which the wear faces are replaced with wear plates that are specifically grinded down to achieve an optimum working brake assembly thickness. As discussed with respect to Hyde '006, Riebe and Hyde '186, Cook is specifically directed at a disk brake assembly that secures the wear surfaces to the core along a periphery of the wear surfaces to prevent relative movement between the wear faces and plate. However, there is no mention of any attempt to improve or secure the mounting surface between the plates (see the flat mounting surface between elements 50 and 52). Accordingly, Cook is precisely the type of refurbishment technique that Applicants have identified as being problematic and for which the unique combination of limitations of the claimed invention are directed at overcoming. Although Carew provides an alternative to securing drum brake wear surfaces by rivets extending through both a core and the wear surface (see col. 1 of Carew), Carew does not explicitly or implicitly suggest that the corrugated mounting surfaces (see 17' in FIG. 3 of Carew) are intended to improve upon mounting structure for securing wear surfaces on either disk or drum brakes that are typically secured only along their periphery.

Hyde '006, Riebe, Hyde '186 and Cook specifically describe structural cores which engage friction wear plates that are entirely and expressly secured by mechanical elements along peripheral edges of the wear plates. Therefore, Applicants submit that the alleged modification(s) of these references to include corrugated mounting surfaces opposite to the wear surface in lieu of or in addition to the peripheral engagement taught by the primary references is in direct contrast to the express teachings of these references. Since these references are all directed at ways of improving upon peripherally securing wear plates to a structural core to prevent movement between the members, one of ordinary skill in the art would not attempt to modify the flat mounting surface opposite to the wear surfaces as these references themselves already purportedly overcome any problems associated with securing friction lining elements to a structural core. Therefore, these rejections should be withdrawn.

In accordance with the above discussion of the patents relied upon by the Examiner, Applicants respectfully submit that these documents, either in combination together or standing alone, fail to teach or suggest the invention as is set forth by the claims of the instant application.

Accordingly, reconsideration and withdrawal of the claim rejection are respectfully requested. Moreover, Applicants respectfully submit that the instant application is in a condition for allowance.

As to the dependent claims, Applicants respectfully submit that these claims are allowable due to their dependence upon an allowable independent claim, as well as for additional limitations provided by these claims.

CONCLUSION

In the event there are any matters remaining in this application, the Examiner is invited to contact D. Richard Anderson, Registration No. 40,439 at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By _____

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